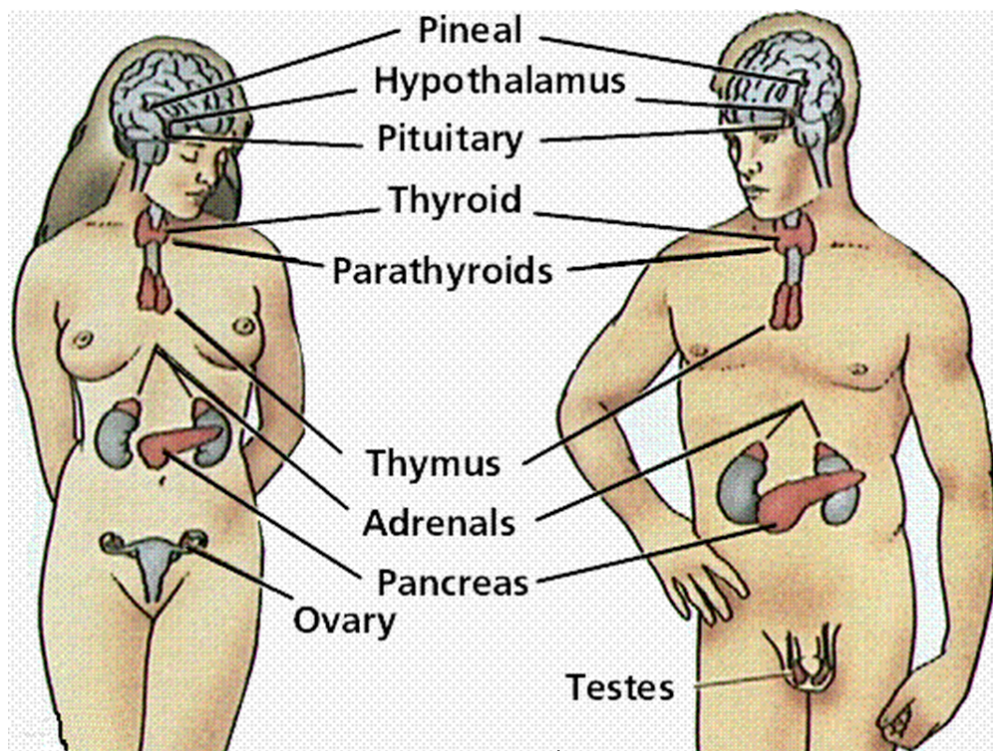


The Endocrine System

function is to control growth, development and metabolism.....& maintain homeostasis

- done through the production of hormones (chemical messengers) in various glands found throughout the body

Location of the Endocrine Glands



Gland

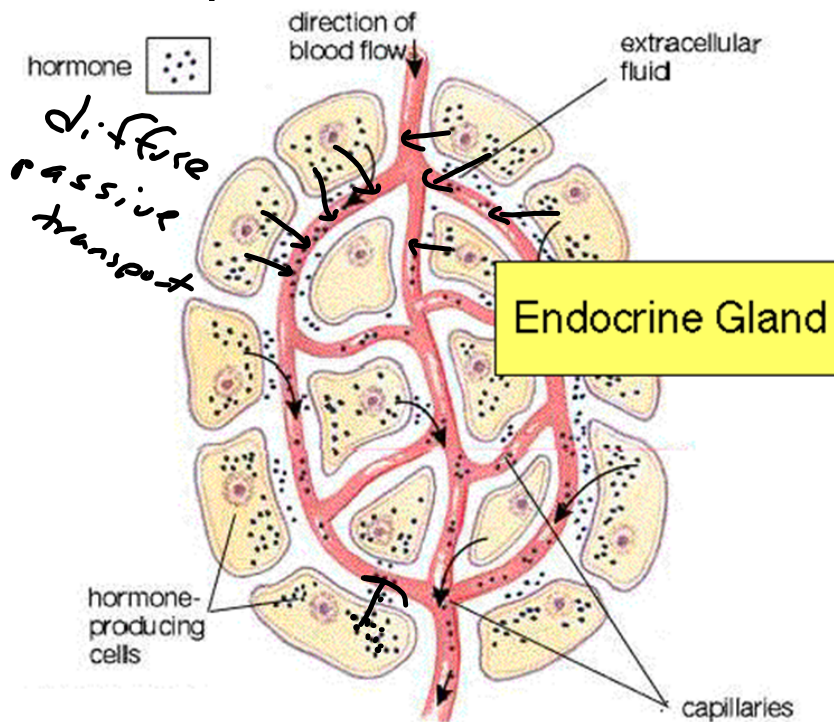
Hormone(s)

Effect(s)

~~Using page 998 name the hormone(s) produce in each of the glands above.~~

Also explain what the hormone(s) regulates.

Endocrine glands secrete hormones directly into the bloodstream. The circulatory system then carries these hormones to the various organs of the body.



Exocrine glands release their secretions (not hormones) into ducts. These ducts then carry the secretions to body surfaces or organs.

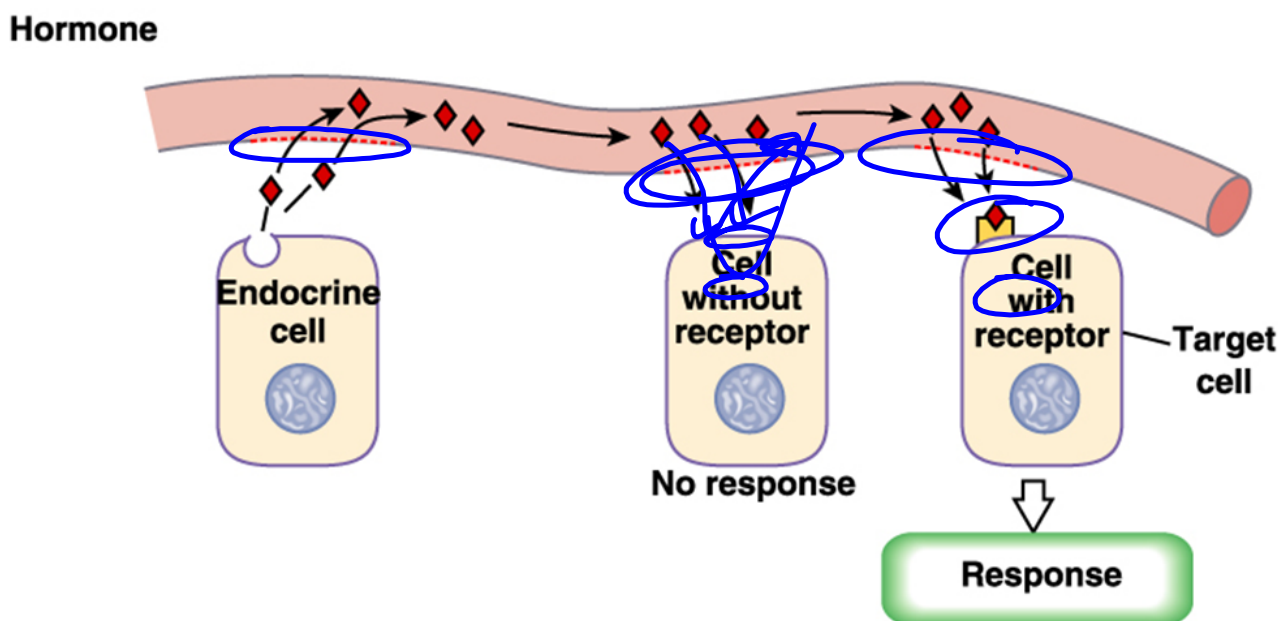
Ex. sweat glands, salivary glands, mammary glands

<http://www.mayoclinic.com/health/sweating-and-body-odor/DS00305/DSECTION=causes>

- What are **hormones**?

Hormones are organic chemical messengers produced and secreted by endocrine cells (found in endocrine glands) into the bloodstream.

Hormones regulate, integrate and control a wide range of physiologic functions.



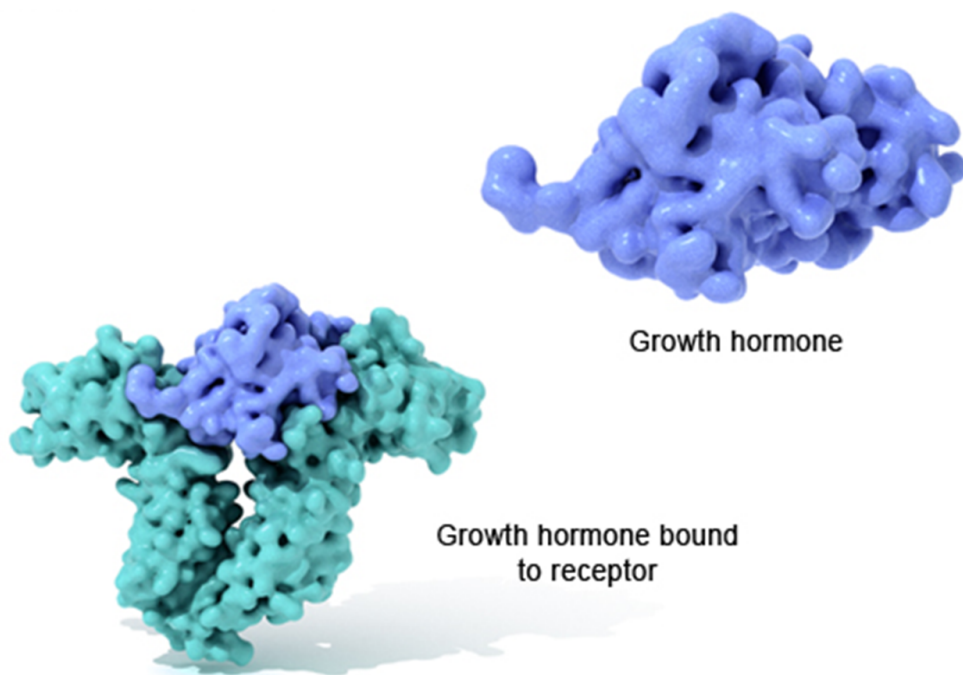
- What are **target cells**?

Target cells refer to cells that contain specific receptors (binding sites) for a particular hormone.

Once a hormone binds to receptors on or in a target cell, a series of cellular events unfold that eventually impact gene expression and protein synthesis.

What are **hormone receptors**?

- Hormone receptors are binding sites on the target cell (either on the surface or in the cytoplasm or nucleus of the target cell)
- activated only when specific hormones bind to them. If a hormone does not/cannot bind to it's receptor, then no physiologic effect results (like a key and lock).



U.S. National Library of Medicine

Growth hormone regulates cell growth by binding to growth hormone receptors on target cells.

How Do Hormones Signal Cells?

There are two different types of hormones that differ in chemical structure and function.

- 1) Steroid Hormones
- 2) Non steroid Hormones (protein hormone)

Steroid Hormones

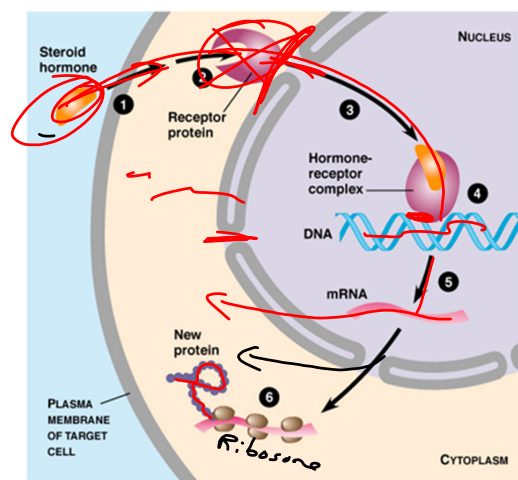
made from cholesterol - a type of lipid (fat)

are soluble in fat - therefore can pass through the cell membrane (lipid bilayer)

- once inside the cell they attach to a receptor (can be in the cytoplasm or on the nuclear membrane)

- this complex then enters the nucleus, binds to a specific portion of DNA

- this will activate a gene response and a message will be sent back into the cytoplasm where a ribosome will be instructed to produce a specific protein (called protein synthesis - we will learn about this later)



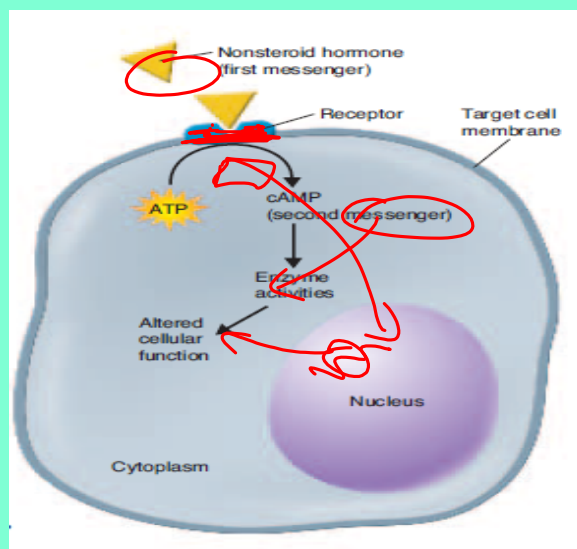
Male and female sex hormones and cortisol are steroid hormones

Protein Hormones - non steroid hormones

- water soluble but not fat soluble
- cannot pass through the cell membrane
- hormone binds to receptors on the cell membrane
- The hormone-receptor complex activates a messenger
- the messenger can then activate the production of an enzyme or other chemicals that result in cellular response

ex. a bear jumps out at you, your adrenal glands produce epinephrine (non steroid)

- when epinephrine reaches your liver it will trigger a response that will eventually cause the production of an enzyme that will result in glycogen being converted into glucose to provide you energy to escape the bear



Prostaglandins

- recently discovered that all cells produce small amounts of hormones that only affect near by cells
- discovered in prostate gland, hence the name
- lipid based - help promote blood clotting
- can lead to unwanted inflammation, smooth muscle contraction, sensation of pain
- ex. can lead to headaches - aspirin inhibits production - headache goes away